

# NJDEP VAPOR INTRUSION GUIDANCE: DATA EVALUATION



John E. Boyer

New Jersey Department of Environmental Protection

[john.boyer@dep.state.nj.us](mailto:john.boyer@dep.state.nj.us)

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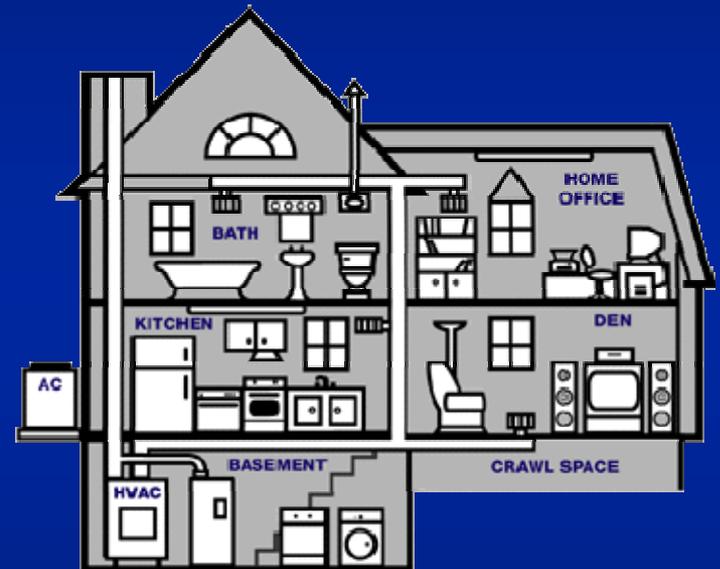


New Jersey Department of Environmental Protection  
Site Remediation and Waste Management



# Sources of Background IA Contamination

- ◆ Consumer Activities
- ◆ Household Products
- ◆ Building Materials & Furnishings
- ◆ Ambient (outside) Air
- ◆ Laboratory Contaminants



# Addressing Background IA Contamination

## Multiple Lines of Evidence Approach

### Primary Factors

- Site-specific contaminants of concern
- Sub-slab soil gas sampling
- Data Review
- Ambient air sampling

### Secondary Factors

- Building walkthrough and survey form
- Indoor air background databases
- Exterior soil gas sampling



# Determine Quality of Indoor Air Data

- review sampling field notes to verify consistency with IA sampling plan
- Verify a NJDEP Certified Laboratory analyzed the samples
- validate/review data for quality assurance/quality control through the Office of Data Quality



# Compare Results to Screening Values

- Confirm unit conversions calculated for the results (ppbv verses  $\mu\text{g}/\text{m}^3$ )
- Compare results to appropriate screening levels (GWSL, SGSL, IASL, or site-specific levels)
- Assess potential contribution from indoor or ambient background sources
- Look for trends in the data



# Looking for Trends

## Differentiate background from site-related contaminants

- compare sub-slab and indoor air results
- compare ambient air to indoor air results
- compare ground water and indoor air results
- review Building Survey form for potential background sources of contamination



# Looking for Trends (continued)

- Compare concentrations from basement and upper level results - is there a trend???
- Compare results between adjacent buildings
- Compare results in buildings with site maps of utility lines and ground water plumes
- Consider factors affecting indoor air concentrations



# Decision Flow Chart for Vapor Intrusion Pathway

## Remediation Decision Matrix - Stage 8

		Indoor Air Concentrations (for COCs)	
		< IASL	>IASL
Sub-Slab Soil Gas Concentrations (for COCs)	<SGSL	No Action	No Action * (if no other subsurface source)
	>SGSL to 10X SGSL	No Action or Monitor	Investigate further or Mitigate
	>10X SGSL	Monitor or Mitigate	Mitigate

### Notes:

\* Investigator should consider the potential for vadose zone (soil) contamination and/or preferential pathways as part of the assessment of vapor intrusion before concluding "no further action"

**Red Decision Points** - investigators should use professional judgement when determining which action is appropriate. Factors to consider include the relative exceedance of the screening level, the ratio of the sub-slab soil gas and indoor air results, building construction, and possible affects of background sources of contamination and sampling errors. (Refer to Chapter 7, *Evaluation of Analytical Results*, for more guidance and information.)



# Assessing Remedial Decision Points

Factors to be considered at decision points include:

- the relative exceedance of the screening level
- the ratio of the sub-slab soil gas and indoor air results
- the current building construction (e.g., 1<sup>st</sup> floor garages, sub-slab vapor barriers, etc.)
- possible effects of background sources of contamination
- sampling errors



# Case Example (1)

Chemical	Soil Gas Results Sub-slab	IA Results Basement	IA Results 1st Floor
Benzene	ND	ND	ND
Cyclohexane	14,801.15	123.92	25.47
Ethylbenzene	ND	ND	10.42
4-Ethyltoluene	ND	ND	18.68
Methylene chloride	ND	ND	100.75
MTBE	18,026.58	137.00	50.47
Toluene	ND	ND	45.22
1,2,4-Trimethylbenzene	ND	ND	17.21
1,3,5-Trimethylbenzene	ND	ND	5.90
2,2,4-Trimethylpentane	93,415.13	700.61	158.81
Xylenes ( <i>m &amp; p</i> )	ND	13.90	38.66
Xylenes ( <i>o</i> )	ND	ND	16.51

Results in  $\mu\text{g}/\text{m}^3$

Stafford Township, NJ Indoor Air Research Project (NJDEP)



# Case Example (2)

**Gas  
Station**

**Tenant 1**



**Retail Shopping Mall**

**Basement**

Acetone - 12,400  
Benzene - 1,447  
MTBE - 7,860

**1st Floor**

Acetone - 25,417  
Benzene - ND  
MTBE - ND  
PCE - 79  
THF - 57

**Tenant 2**

**1st Floor**

Acetone - 35  
Benzene - ND  
MEK - 1,690  
MTBE - 2.2  
PCE - 2,281  
THF - 1,010

**Tenant 3**

**1st Floor**

Acetone - 18  
Benzene - 1.1  
MEK - ND  
MTBE - 2.7  
PCE - 460  
THF - ND

**Tenant 4**

**1st Floor**

Acetone - 83  
Benzene - 0.8  
MEK - ND  
MTBE - 1.6  
PCE - 1,322  
THF - ND

